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PUBLIC HEALTH ABSTRACTS AND REVIEWS

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HEALTH IS A STATE OF COMPLETE PHYSICAL, MENTAL AND SOCIAL WELL BEING AND NOT MERELY THE ABSENCE OF DISEASE OR INFIRMITY

—WORLD HEALTH ORGANIZATION

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RICE AND HEALTH

BY

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Rice is one of the most extensively grown and the most widely used among world's foodstuffs. It is the staple food of over half the human race. The masses in South India look up to rice to provide the fuel for work and recreation, and also the bricks for the building, repair and maintenance of the body. It is the chief and sometimes the only item of all meals of the day and a common ingredient of most sweets and snacks, eaten for variety or luxury. Health in its wider aspect connotes everything which contributes to the physical, mental and social wellbeing. "Health is wealth"; "The shortest way to the man's heart is through his stomach"; "A man is what he eats". These sayings indicate how the common man has always been associating food with health and health with prosperity.

The diet of South India has been described as the "poor rice diet". The end and aim of any diet is to lead one to better and fuller health. Is rice so poor a cereal or is it the rice diet which is really poor? How best can rice diet be made richer? These are pertinent questions. Their answers will help us to appreciate the rice problem in our country.

There are marked differences between the different regional diets in India, the *Sikh diet,* the *Pathan* diet, the *Marathi diet, Gurkha diet,* the *Kanarese diet,* the *Madras* diet, etc. Some of these peoples are rice eaters, some are wheat eaters, while others are mixed diet eaters. The differences in the physical build of these peoples are often ascribed to their respective traditional diets. The Sikhs and the Pathans are wheat eaters and therefore their better physical build is often construed as proof of the superiority of wheat over rice. Much work has been done in recent times to evaluate diets and also their component ingredients. It is believed now that it is far more true to evaluate foods in terms of the whole diet than in terms of their individual ingredients. Most foods are incomplete and whole foods like milk and eggs, even if available, will not be tolerated by all for long time. The deficiencies in foodstuffs are generally reckoned from their protein fractions and of the more important minerals and vitamins. Any food, however deficient, can be supplemented naturally by other foodstuffs or enriched or fortified with the missing nutrients. The cereals as a class, have proteins of lower biological values, as compared to animal foods, but a selected combination of cereals, pulses and vegetables can attain high nutritional standards. There are inherent deficiencies in all foodstuffs and rice is no exception. Wheat and most other cereals have quantitatively, more proteins than rice, but the protein in rice has been found to be of a superior order qualitatively. It has higher digestibility and biological values than wheat, barley, maize, etc. Human feeding trials have been carried out with rice alone, rice and wheat; rice, wheat and barley; rice wheat and maize, etc., along with the usual quota of pulses, potatoes, vegetables, etc., in customary poor Indian diets, but with no milk or flesh foods. From the point of view of digestibility and biological effect, rice alone has been found to yield even better values than any of the other combinations mentioned.

Rice is, however, normally deficient in fats, the minerals, calcium and iron, and the vitamins A, C and D. Overpolished raw rice is also deficient in vitamins B1 and B2, which are lost during milling. Diet and nutrition studies carried out in different parts of Madras State and elsewhere in South India, have also proved the effects of these deficiencies. It may be understood, however, that such deficiencies of one or more nutrients exist in every cereal. The value of a mixed diet comprising of more than one cereal or millet, which will supplement each other, should therefore be appreciated. Rice diet has earned the name of a poor diet, not only because of its inherent defects, but because of the lack of support it receives from the other ingredients in the diet. This is a result of both ignorance and poverty. The Sikh and the Pathan show off better on wheat diet, because of the larger quantity of dhal, milk, ghee, vegetables, fruits, etc., which he takes and which are capable of amply correcting what wheat is lacking in.

Let us now consider how best rice diet can be made richer. Rice predominates in rice diets. The first step in improving the rice diet is therefore to attempt to improve the quality of the rice itself. Rice is consumed as either raw rice or par-boiled rice, in different parts of the world. The par-boiling process is never applied to the other cereals. It actually consists of steaming or boiling paddy, after varying periods of soaking. This process effects striking improvements in the nutritive values as compared to raw rice. The original purpose of par-boiling was perhaps only to facilitate easy husking during subsequent pounding. It loosens the husk and also renders the bran coat more tough and adherent and less readily removed during further processings. It is somewhat richer in nitrogen and phosphorus, though unlike vitamins, etc., the losses in these are roughly the same, when milled to the same degree as raw rice. The vitamins tend to penetrate into the kernel, perhaps as a result of their redistribution from the germ, scutellum and aleurone layers, with the result that enough of them is retained in the kernal even after milling. This process also helps to make the germ and scutellum more attached to the grain. It may thus be said beyond doubt that par-boiled rice is superior to raw rice. The use of par-boiled rice is quite common in South India, almost among 90 per cent of the population. The par-boiling process is also in vogue in parts of Malaya, Burma, Ceylon, British Guiana, Java, etc. One of the best methods of par-boiling advocated is to steep the paddy for about four hours in water at about 75°C, which makes subsequent steaming unnecessary. An improved method of par-boiling called " rice-conversion " is in vogue in United States of America, where the paddy is subjected to steaming for a short time under increased pressure. This involves the use of elaborate machinery, but the resultant product is good and quite uniform.

The quality of both par-boiled and raw rice is materially effected by the milling process, as distinguished from the time-old home-pounding of rice. By repeated polishing in the mills, all the germs and most of the bran in which the protein, vitamins and mineral matters are chiefly concentrated, are lost. Polishing increases the keeping qualities of rice but has nothing else in its favour. Home-pounding has been fast disappearing from Indian homes with the advent of the rice mills. From the points of view of both nutrition and economics, it deserves to be revived, to enable us to obtain better rice and more rice for our money. There was never a more healthy practice, a practice which combined in itself recreation and utility, a practice which had grown up as part of the routine of the home and a practice to which our great grandmothers owed their health and longevity. Home-pounding is still practised in many parts of the west coast in areas out of reach of the mills. There is a movement already under way to revive home-pounding of rice, on the basis of a cottage industry. It has all the backing

of the State and the informed public. This movement deserves our enthusiastic support. The speed of progress in this venture will, however, much rest with the extent of willing co-operation of the wide spread milling industry. It is sure to catch up the imagination of village folk if they only realize the possibility of lucratic employment for men and women, boys and girls, of all villages. One can earn as much as one can work. It will also eventually work out as an effective link between the urban and rural populations and strengthen their bond of interdependence.

There is yet another and equally important factor which is concerned in the better utilisation of rice. This concerns the cooking of rice. Here, we may have to turn for guidance to the newer knowledge in the science of food and nutrition. The appeal to the practices in the past is no help here. It will be like the argument of the village grandmothers who say in praise of their daughters, " she ought to know something about babies, she having lost seven ". It has been found as the result of work in many a rice-eating country, even in our own, that we lose much of the rice from the way in which it is processed and cooked. The superior merits of par-boiled rice has already been emphasised. The practice of repeated washing of rice before cooking, removes with the wash water, much or most of the nutrients concentrated on the surface of the grains. It is meant to remove stones and other extraneous matters, but this can be done equally well by hand-picking, winnowing, etc. Washing should be avoided or at least minimised. The addition of too much water with the rice, only to be drained off at the end of cooking, is yet another serious source of loss of nutrients and of calories from rice. The cookery of rice differs from country to country and even from house to house. It is rather difficult also to shake off the tenacious adherence of housewives to accustomed practices. As it is much concerned with the nutrition derived from rice, a change to better practices should be welcomed. In Canton (China) the practice is to cook rice with a volume of water equal to the rice or perhaps one and a half times as much. The rice is cooked over a slow fire in a thick walled mud pot till all the water is absorbed. The cooked rice is loose and free as most people like, and the nutrient losses are negligible. The quantity of water may vary a little with different kinds of rice, but practice will decide the optimum. Steam cooking of rice is the very best. Here also the principle is to steam the rice with the minimum of water needed which will all be absorbed when the rice is well cooked.

Proper and scientific storage of rice with a view to minimise fungal, insect, and rodent attacks, is another aspect of the rice problem which has not received adequate attention in our country. The Hygiene of storage premises is important from many health aspects. It is equally an economic proposition.

It has been stated earlier that rice, as a staple cereal, is not so inferior as has been supposed in the past, and that there are ways and means by which it can be rendered richer, by minimising the losses and adopting improved methods of processing and cooking. Rice diet is often pointed out as the cause of the high sickness, death and birth rates in rice-eating countries. It has however to be remembered that rice-eating countries, accidentally or otherwise, happen to be also the economically backward countries, which factor operates to exaggerate the effects of the rice diet on health, for lack of the required protective foods. An ill-balanced rice diet can really be too bad for health but a well-balanced rice diet can also be as good as any other diet. Many a rice-eating country, including portions of South India, have been the foci of beri-beri, a dangerous disease affecting the young and

the old. The substitution of parboiled rice for polished milled raw rice has proved to be an effective prophylatic and this discovery will ever remain as an achievement in the field of public health nutrition. Signs of protein deficiency exist in our country but they are perhaps either due to lack of adequate quantities of rice or the lack of necessary supplements like milk, pulses, vegetables, etc. Calcium deficiency is one of the major faults in our rice diet, and this can to a larger extent be prevented by resorting more and more to the familiar ragi millet which is very rich in it. Diseases like Keratomalacia and night blindness due to deficiency of Vitamin A, Stomatitis of different kinds due to lack of nicotinic acid and riboflain, anæmias due to low iron contents in the usual diets and to the extra demands of iron due to malaria, hookworm, etc., are also quite common. These are all remediable on a regimen of improved rice diet. The diet should include milk, plenty of green leafy vegetables, pulses, fish, meat, eggs, fruits, etc., though to many a man poverty restricts the choice of foods. We have been begging for food for a long time. We have then fought in the food front with determination and have won with laurels. There is now rice enough and to spare. We shall soon win the health front without a fight, by eating wisely and nicely.

—By courtesy All-India Radio, Tiruchirappalli.

The place of Health Services in the structure of State Government.

(Abstract from American Journal of Public Health and the Nation's Health, Volume 46, No. 2, February 1956.)

The provision of public health services is an accepted responsibility of Government. Throughout recorded history Governments have assumed in a varying degree the responsibility for the protection of the health of the people. In an enlightened society the motivation for the assumption of this health responsibility is for humanitarian purposes. Moreover, no nation, state, or community can afford to condone conditions which adversely affect the health of the people. National economy, the nation's defence potentials, industrial and agricultural production, and the welfare of the people individually and as a nation are dependent upon their health status.

Public Health has been defined as the science and art of (1) preventing disease, (2) prolonging life and (3) promoting health and efficiency through organized community effort. Government has assumed to a variable degree the responsibility for providing some of these services. Voluntary health agencies are an important factor in the provision of others. It is an axiomatic principle of public health practice that Government should provide only such health services as the individual cannot provide for himself, with the help of his family physician, dentist and other practitioners, or such services as can be provided most effectively on a community bas's.

Public health practice is a speciality. Its administration requires knowledge and skills in medical sciences, public administration, analysis of community health needs, as well as methods of providing community health services. The objectives of a public health programme administered by any Government are to give the services for which it has assumedr esponsibility in an effective and economical manner to all of the people who need the service at the time and place where the services are necessary. Because of the complexity of recent developments in the medical and social sciences, public health practice is dynamic and its administration must be flexible, ready to adapt itself to the application of new knowledge and at the same time ready to meet catastrophies—both natural and man-made. Public Health Services and responsiblities assumed by State Government should therefore be under the direction of the most competent experts available.

SOME INTERNATIONAL TRENDS IN NUTRITION.

[Abstract from American Journal of Public Health and the Nation's Health, Volume 46, No. 2, February 1956.]

A release by Science News Letter, September 3, 1955, carried the head line, " World Population Booms to More Than 2·5 Billion ". The initial alarm, however, about threats of starvation upon reading such an announcement was tempered by the good news released earlier in the year from United Nations agencies. For the first time since World War II, the rate of food production over the world had increased faster than the populations had grown. The gain included both quantity and quality, so that the net result in 1954–55 represented a gain in improved health and higher standards of living. This accomplishment was achieved despite continued serious difficulties in specific areas.

The most severe problems in different countries stand in strange contrast. Gross undernutrition and malnutrition still persist in many parts of the world, in the United States the most damaging kind of malnutrition appears to be overweight. The excessive intake of calories has been accompanied by over-all improvements in the nutritive quality of the food consumed, but overweight as such gives no assurance that the food intake is qualitatively adequate. In fact, those who overeat with greatest abuse to their bodies are frequently those who are least considerate of the quality of their diet. A modest degree of sensible education and discipline, along with continued research, would suffice to solve most of the currently recognized problems.

Market-wise, the situation is about as badly unbalanced over the world as the nutritional picture. In this respect, too the tide was turning slightly towards improvement near the end of the year. Food was beginning to flow more freely from areas of stored surpluses to those of greatest need.

Partly as a result of recent broad advances in nutrition research and education, but in part as the fruit of several years of intensive effort on the part of United Nations personnel (especially the Food and Agriculture Organization, the World Health Organization and the United Nations Children's Fund) world-wide attention has been focussed on the great need to provide for better nutrition of mothers and children —especially through the immediate post-weaning years. Otherwise, the penalties imposed during this critical period lead to an enormous world-wide wastage in life and vigour. The resulting restriction on potential service as citizens can scarcely be appraised despite its magnitude.

The problem centres most intensely on the need for good quality proteins, but deficiencies in this respect are often accompanied by mineral and vitamin deficiencies. Hence, first emphasis is directed towards increased supplies of milk, meat, eggs, fish, and green leafy foods plus antiscorbutic fruits, and finally upon plant proteins which are individually inadequate, but when scientifically adjusted on a complementary basis with respect to their amino acid content could suffice to alleviate the major incidence of injuries caused by protein deficiency. These nutritionally appraised foods under investigation include cereals as a main caloric source and such low cost available item as the flours that can be furnished from presscake residues in the manufacture of oils from sesame, peanuts soya-beans, and possibly cotton seed.

B.C.G. VACCINATION IN FINLAND

BY

Severi Savonan.

Secretary, Finnish National Anti-Tuberculosis Association.

(From the Indian Journal of Tuberculosis, Volume II, No. 3, June 1956.)

The first B.C.G. vaccination in Finland were performed in 1941, their number amounting to 1,800. The number of vaccinated individuals increased slowly from year to year, in 1947 reaching 61,200. During the period from 1941 to 1947, 390,000 tuberculin tests and a total of 169,300 vaccinations were carried out.

1948 was a veritable year of mass vaccination, for as many as 743,350 tuberculin tests were made and 325,510 persons vaccinated in this single year. That year the vaccination was directed especially to persons between 15 and 25 years of age. All members of this age group were sent a letter each which invited them to submit themselves to tuberculin test and, if necessary, to vaccination. The number of 15 to 25-year olds that were vaccinated in that year was 93,200.

After that, mass vaccinations have been continued, from 130,000 to 140,000 vaccinations having been performed annually. Thus the total of vaccinations was about 1·3 millions, this means that about 30 per cent of all inhabitants of the country have been vaccinated. The figure 1·3 millions in itself is very high when we consider that getting infected with tuberculosis was formerly so common in this country that practically everybody got natural primary infection before reaching the age of 25.

B.C.G. vaccination has been particularly aimed at new-born babies, infants and youngsters between 15 and 20.

The vaccination is carried out in Finland by the intradermal method introduced by Professor Wallgren. It is administered on the outside of the left thigh.

Tuberculin Tests.

For tuberculin tests we use a method of our own, which is a modification of the method published by the Italian Trambusti in 1929. As far as we know, Trambusti's method is not used in any other country. In Finland a modification of the Italian method has been developed and been in use for a long time already, about 3 million tuberculin tests having been performed by it. So far, the results of this test in Finland have been very satisfactory. The test is a administered as follows: a small drop of *undiluted* tuberculin is placed on the forearm near the elbow joint, and an empty injection needle No. 12, thus a fairly coarse one, inserted through this drop. The needle is thrust into the skin intradermally to a depth of about 5 mm. The needle is twisted two or three times and then withdrawn. The reaction is read after the elapse of three days. If the redness and infiltration is at least 4 mm., the reaction is regarded as positive.

The modified Trambusti test has several good points. The reaction is in general very clearly either positive or negative. In general, it is not, as might be feared, very strong. The reliability of the test has been widely checked in Finland by applying in

cases shown by Trambusti to be negative, a Mantoux 1 : 100, or 1 mg. Only a very small percentage of these negative cases have reacted positively to a Mantoux 1 : 100. The view is held in Finland that B.C.G. vaccination can be given without further tests to persons with an allergy so weak that they react negatively to the Trambusti test.

With children up to the age of 10 the Moro-patch test has also been used, and the aim is to make this test in the future regularly with all children of this age.

So much vaccine is used that the anæmic wheal appearing on the skin has a diameter of 10–12 mm. A control test to establish the effectivity of the vaccination is carried out 4–6 months later. Provided the test has been performed in the proper way more than 90 per cent of the vaccinated become tuberculin positive.

The vaccinations are performed mainly by Public Health nurses. According to the Public Health Act, we must have a Public Health nurse for each 400 inhabitants; the number of active Public Health nurses active in the field is at present 1,300. These Public Health nurses are trained nurses (three-year course) who have been given an additional course lasting 8 months in social hygiene.

The vaccination is organized by the Finnish National Anti-Tuberculosis Association. The vaccine is obtained from the Bacteriological Laboratory of Gothenburg, Sweden. The vaccine comes to Finland once a week by air mail, and it is immediately forwarded by the office of the Association to about 1,000 different recipients: to public health nurses, maternity hospitals, health centres and so on.

The Finnish B.C.G. Vaccination Programme.

From the very beginning it has been our objective to achieve tuberculin positivity by means of B.C.G. vaccination before anyone receives natural primary infection. We endeavour to vaccinate all new-born infants. When the children start primary school at seven, they are given the tuberculin test, all non-reactors being vaccinated; this procedure is repeated when the children leave school at 14.

As evidence for the fact that owing to the vaccination a considerable part of the children have become tuberculin positive at a comparatively early age it may be mentioned that of the 98,000 tuberculin tests given to children between one month and six years of age in 1954, no less than 80·2 per cent showed positive reaction.

B.C.G. vaccination is voluntary in Finland, and it has become very popular. However, as it has been found out, that youngsters very often neglect this voluntary vaccination, an Act was passed in Finland in 1954 which makes B.C.G. vaccination compulsory for all persons who within a certain year become 19 years old, the vaccination having to take place during that year. Young people of this age are, as we all know, particularly susceptible to infection and the vaccination is made even more important by the fact that people of the age move in large numbers into new surroundings in order to pursue studies, or to find occupation, or to serve their time in the army and so on. In the new place of residence they run the risk of primary infection with tuberculosis and an active disease as its result. So far, such compulsory vaccination has been carried out once only; in our opinion it was a success.

Are there any results of B.C.G. vaccination in Finland to be quoted already? As tuberculosis among infants and young children begins to disrepair in Finland, it is obvious that intensive B.C.G. vaccination is one of the principal factors to achieve this result. In the tuberculosis district of Pori (comprising 100,000 inhabitants) 60 children under the age of 15 died of tuberculosis during the three years from 1936 to 1938, i.e., in a time when B.C.G. vaccination had

not yet been introduced. In the triennial period 1952–1954, after intensive vaccination had been going on for more than ten years, the corresponding figure was one. In this district nearly 100 fresh cases of infectious tuberculosis per year were detected both in 1953 and 1954. This implies that the statistics we have quoted cannot be a consequence of decisive decrease in the number of sources of infection.

In the so-called Christmas Seal Homes of the National Anti-Tuberculosis Association new-born children of tuberculous mothers are taken care of during the first eight months of their lives. When they are sent home from the Christmas Seal Homes they have been B.C.G. vaccinated and are tuberculin positive. The number of children that have been cared for in the Christmas Seal Home of Tampere from 1937 to 1951, that it, during a period of 14 years, is in the neighbourhood of 800. Many of these children have returned to their own homes, which more often than not are infected with tuberculosis. During these 14 years only three of these nearly 800 children have died of tuberculosis.

Another conclusion piece of evidence of the disappearance of infantile tuberculosis is to be seen in the fact that it has been found necessary partly to close children wards in tuberculosis sanatoria on account of a lack of patients.

Cases of tuberculous meningitis have also decreased to a considerable extent from an annual six or seven hundred to fifty. This figure is still quite high, but it is remarkable that most of deaths caused by meningitis occur among children that have not been vaccinated. They are children of parents who for religious or other reasons have not allowed their children to be vaccinated. Perhaps, we would do well to make vaccination compulsory for all new-born children by force of law.

One consequence of B.C.G. vaccination should also be a decrease in the *incidence of pleurisy* among young people. In recent years a relatively strong falling tendency has been noticeable in this respect, as for instance in the army.

In Finland we feel convinced that B.C.G. vaccination is a powerful weapon in the cambat against tuberculosis among children and adolescents. As regards this vaccination, we have already got so far that in the whole country very few persons are still tuberculin negative. Among the older age groups this is a consequence of a natural primary infection once received, whereas in the younger ones it may be mainly attributed to B.C.G. vaccination. For some time to come at least we are going to intensively continue this vaccination according to the same principles as up till now.

VERDICT ON B.C.G.

(From the Indian Journal of Tuberclosis, Vol. III, No. 3, June 1956.)

The report of the British Medical Council into the efficacy of B.C.G.* Vaccination is the result of a carefully planned and meticulously conducted investigation which was done in a group of 56,000 children between the ages of 14 and 15½ attending schools in or near London, Birmingham and Manchester. Among the tuberculin negative children in the group 14,000 were given B.C.G. Vaccination, and 13,300 were left unvaccinated to serve as controls. These were followed up for a period of 2½ to 4 years. The conclusions drawn after a minimum of 2½ years of observation in every case are significant. In the group vaccinated with B.C.G. the annual incidence of clinical tuberculosis was only 0·037 per cent whereas in the group of unvaccinated controls the incidence was 0·194 per cent. Further, no case of miliary tuberculosis or tuberculous meningitis occurred in the vaccinated group while in the unvaccinated controls group there were three cases of tuberculosis meningitis and another three of miliary pulmonary tuberculosis. According to the report, if *none* of the tuberculin negative children included in the trial group had been vaccinated 165 cases of tuberculosis would have been expected among them during the period of observation, and if *all* of them had received B.C.G. only 30 cases would have occurred. The difference of 135 cases represents a reduction of 82 per cent of the tuberculosis in the tuberculin negative group. Even if the whole group of 56,000 including those who had already been infecte and not eligible for vaccination is taken into account this difference of 135 cases represents an expected reduction in the incidence of tuberculosis of 55 per cent as the result of vaccination of those who had been tuberculin negative among them. The report says that the benefit that can be expected from B.C.G. Vaccination corresponds to the prevention of 1·6 cases annually among every 1,000 B.C.G. vaccinated children. Concidering the low cost of vaccination this means a large saving to the nation by way of treatment charges, support to dependents and man-power, not to speak of the number of persons who would have been infected by them. The report further indicates that it would be desirable to vaccinate children before a large proportion of them get natural infection. It also says that though the findings are on the results of 2½ years completed observation, yet a considerable number were followed up for a period of four years, and there are indications that the protection afforded by B.C.G. Vaccination lasted at least four years—the longest period of observation under the present instigation.

This report, coming as it does from the British Medical Research Council which is internationally recognised as one of the most scientific and reliable research bodies, is of special significance to us in India particularly because B.C.G. Vaccination is now being carried out extensively in this country as a preventive measure against tuberculosis. We commend this report to tuberculosis workers, administrators and the people of India.

SMALL-POX VACCINATION BY THE MULTI-PRESSURE TECHNIQUE

BY

L. M. Bhattacharji and A. K. Ghosh Hazra.

Section of Epidemiology.

(From Alumni Association Bulletin, All-India Institute of Hygiene and Public Health, Vol. II, No. 4, April 1956.)

Introduction.

At the request of the Government of India to the Director of the Institute, tests were carried out to determine the advantages or otherwise, of the multi-pressure techinque of vaccination against smallpox, as compared with the scratch method, which is of routine use in most parts of this country.

This technique, first described by Leake (1929) in the United States of America, is the method of choice in that country. It has also been tried in Great Britain (Parish, 1944) and recommended for general use by the Ministry of Health. Several advantages are claimed for this method. The operation is simple and painless. This method draws little blood, produces the least trauma and minimises the risks of sepsis. Scars following vaccination by this method are smaller. The number of successful takes following this method, is as high as the scratch or any other method. The local reactions are much less severe and less painful and it is rapid in action, though this claim is denied by many.

Technique.

For vaccination by the multi-pressure technique, the instrument used was a sterilized Hagedorn surgical needle. This was held tangentially over the skin of the left deltoid muscle which was then gently but firmly pressed thirty times with this instrument over a small drop of lymph spread on an area of 2-3 mm. The pressure employed was just sufficient to break the epidermis, but did not draw blood. For the scratch method, the instrument employed was the rotary type of vaccination lancet, first devised and used by Pinto (1935). This instrument, used as a routine in this country, made on the skin a small, superficial, circular scratch of 2-3 mm. diameter and, when properly used, very rarely draw blood. The skin was sterilized with ether. No dressings of any kind were placed on the part vaccinated. Applications of sandalwood tumeric or other pastes, which are often applied on the vaccinated part when vesculations appear, were strictly forbidden. This could not, however, be enforced in all cases.

The Experiment.

Persons belonging to different age-groups and requiring either primary or re-vaccinations, were vaccinated alternately by either of these techniques with calf-lymph manufactured by the West Bengal Government Vaccine Institute, Calcutta.

Reactions.

Primary vaccinations were inspected as a routine, between the seventh and ninth days after vaccination and again before the end of the second week, while in re-vaccinations, these were done on the third and seventh days respectively.

All reactions were recorded as (i) Primary vaccinia, (ii) vaccinoid or accelerated and (iii) non-vesicular, following the nomenclature recommended by the WHO Expert Committee (1949). Those primary vaccinations which failed to elicit a successful take, were as a rule subjected to a second, often to a third vaccination using the same technique but a different batch of lymph. None was taken as unsuccessful, until successive attempts at vaccination failed to produce a vesicular response. For purposes of comparison of the effectiveness of the two techniques, we have based our conclusions on the following criteria, viz. :

the type of reactions observed;

the percentages of successful primary takes;

day of maturation of the vaccinial lesions;

severity of the local reactions;

constitutional reactions;

complications;

time taken to vaccinate; and,

trauma produced by the operation.

Type of Reactions.

The different types of reactions as seen in both primary and revaccinations have been incorporated in Table I. It will be observed from the table that among those vaccinated for the first time, 89·9 per cent of the vaccinations performed by the pressure technique, as compared to 91·1 per cent by the scratch method, showed typical primary vaccinial reactions. In another 1·4 per cent of the pressure series it was of the accelerated or vaccinoid type, compared to 1·6 per cent with the scratch. Thus, taking vesicular reactions (primary vaccinia and vaccinoid) as the criteria of success of the operation, 91·4 per cent of the vaccinations performed by the Multi-pressure method and 92·7 per cent by the scratch technique could be considered to have been successful.

TABLE I.

Percentage distribution of the types of reactions seen after vaccination.

Serial number.	Previous vaccination.	Multi-pressure. Total vaccinations.	Primary vaccinations.	Vaccinoid.	Non-vesicular.	No reaction.	Scratch. Total vaccinations.	Primary vaccinia.	Vaccinoid.	Non-vesicular.	No reaction.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1 ..	No	139	125 (89·9)	2 (1·4)	2 (1·4)	10 (7·2)	124	113 (91·1)	2 (1·6)	1 (0·8)	8 (6·5)
2 ..	Yes	129	4 (3·1)	17 (13·2)	95 (73·6)	13 (10·1)	138	3 (2·2)	24 (17·4)	108 (78·2)	3 (2·2)

(Figures in brackets indicate percentages.)

Among the revaccinations, however, percentages of typical vesicular reactions were 16·3 with the pressure method and 19·6 with the scratch. Thus, the type of reactions obtained after vaccinations, did not seem to differ with the technique employed, for the percentages of successful takes were more or less equal with either of the methods and the differences noted were so small as to be statistically not significant.

Of the 127 successful primary vaccinanations performed by the multi-purpose method, 120 or 86·33 per cent were successful at the first attempt. In another seven or 5·04 per cent, vaccination had to be repeated. Compared to these, the corresponding percentages for the scratch method were 89·52 and 3·22. Thus, the chance of obtaining a successful take at the first attempt was more or less the same with both the techniques and any difference noted was not considered statistically significant.

Time of Maturation of Successful Lesions.

It is well known that immunity after successful vaccinations develop fully between the eighth and tenth days after vaccination, at a time when vesicular reactions usually begin to mature (Marsden, 1946). The day when pustulation was at its height was therefore taken as a measure of the establishment of immunity and for this purpose only primary vaccinations have been included in Table II. This shows that following vaccinations by the multi-pressure method, 88 per cent of the successful reactions became fully formed pustules by the tenth day after operation, 9·6 per cent by the twelfth day and the remaining 2·4 per cent by the fourteenth day; while with the other technique, 96·5 per cent matured fully between the seventh and tenth days and in the remaining 3·5 per cent it was delayed by another two days. Hence, the majority of the successful lesions progressed more or less normally, irrespective of the method used, except that 12 per cent of the reactions following multi-pressure technique developed rather slowly; whether this meant a corresponding delay in the development of anti-bodies in the blood remains to be investigated which we hope to carry out with the collaboration of Dr. B. K. Ghosh Roy of the section of Microbiology.

TABLE II.

Days of maturation of vesicular reactions.

Serial No. (1)	Technique of vaccination. (2)	Nature of reaction. (3)	Days. 5–6. (4)	7–8. (5)	9–10. (6)	11–12. (7)	12–14. (8)	Total reaction. (9)
1	Multi-pressura ..	Primary vaccinia ..	0	20 (16·0)	90 (72·0)	12 (9·6)	3 (2·4)	125
		Vaccinoid	2 (100·0)	0	0	0	0	2
2	Scratch	Primary vaccinia ..	0	36 (31·9)	73 (64·6)	4 (3·5)	0	113
		Vaccinoid	2 (100·0)	0	0	0	0	2

(Figures in brackets indicate percentages.)

Degree of Local Reaction.

The severity of local reactions of the successful vaccinial lesions, as measured by their diameters (including the inflammatory areola), was classified as mild, moderate and severe according as the diameter was up to 10, between 11–20 and above 20 m.m. respectively (Table III).

TABLE III.

Percentage distribution of the vaccinial lesions according to the degree of reaction.

Serial No.	Technique of vaccination.	Type of reaction.	Total reaction.	Mean diameter including areola in mms.	Degree of local reaction. Mild.	Moderate.	Severe.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Multi-pressure ..	Primary vaccinia ..	125	15·2	20·8	76·0	3·2
		Vaccinoid	2	10·0	100·0	0·0	0·0
2	Scratch	Primary vaccinia ..	113	15·7	15·1	81·4	3·5
		Vaccinoid	2	10·0	100·0	0·0	0·0

It was observed that 20·0 per cent of the primary vaccinial reactions obtained after vaccination by the multi-pressure technique were mild in nature, while 76·0 per cent were of moderate severity and only 3·2 per cent could be said to have produced severe reactions. With the other technique, 15·0 per cent of such reactions were mild, 81·4 per cent moderate and the remaining 3·5 per cent severe. Thus, vaccinations by either of these techniques generally gave rise to reactions of moderate local severity. This had a mean diameter of 15·2 mm. in the case of the multi-pressure method and 15·7 mm. in the other. Any difference in the technique of vaccination employed, did not correspondingly increase the chance of eliciting a severe local reaction.

Constitutional Reactions.

The constitutional reactions after vaccinations were mainly malaise, fever, axillary adenitis, body-ache, sleeplessness, loss of appetite, etc. Such symptoms usually appeared at the time of pustulation of the lesions and lasted for not more than two to three days. In those vaccinated by the pressure technique severe reactions as indicated by fever, temperature going above 102°F, painful, often tender regional glands, malaise, occasional aches in the muscles and joints of the body were seen in not more than 32·8 per cent of the cases, corresponding to 37·17 per cent in vaccinations performed by the scratch method. The majority of those vaccinated by either technique suffered only from fever of a moderate degree with or without any axillary glandular enlargement. Thus, generally speaking, we feel that severer reactions were somewhat less common when using the pressure technique than the other.

Complications.

The only complication after vaccination, that we came across, was the appearance of generalized papular skin rashes, seen at the time of maximum pustulation of the lesions. This occurred in two infants, both vaccinated for the first time, by the scratch method. This was considered as allergic in nature, due perhaps to the application of turmeric or other paste on the vaccinated part and disappeared spontaneously as soon as such applications were stopped.

Time taken to Vaccinate and the Painlessness of the Operation.

It was noted that while a two-point vaccination by the scratch method took on an average not more than two seconds to perform, a single-point vaccination using thirty pressures with the needle took at least ten seconds to complete. Thus, so far as speed is concerned, it is felt the advantage lies distinctly with the scratch method using the rotary lancet. The multi-pressure method, however, produced the least trauma as judged by the pain produced or by the oozing of blood after the operation in those who had tender skins.

Conclusions.

Taking into consideration all the factors mentioned above, we are led to believe that except for its comparative painlessness and lesser chance of producing severe constitutional reactions, vaccination by the pressure method holds no distinct, advantage over the scratch method using the rotary type of vaccination lancet. Moreover, during epidemics or mass vaccination campaigns, where speed of operation is essential the method of choice should be the scratch method with the rotary lancet.

Acknowledgment.

Our thanks are due to the Health Officer, Howrah Municipality and his staff, for their co-operation and to the Director of the Institute for his encouragement.

TABLE IV.

Percentage distribution of vaccinial lesions according to constitutional symptoms produced.

Serial No.	Technique of vaccination.	Type of reaction.	Total reaction.	Nil.	Moderate fever only.	Moderate fever and adenitis.	High fever only.	High fever and adenitis.	Adenitis only.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Multi-pressure ..	Primary vaccinia ..	125	11 (8·8)	58 (46 4)	15 (12·0)	16 (12·8)	25 (20·8)	..
		Vaccinoid	2	2 (100 0)	..	..	..	..	..
2	Scratch	Primary vaccinia ..	113	5 (4·43)	36 (31·85)	28 (24·78)	13 (11·50)	29 (25·67)	2 (1·77)
		Vaccinoid	2	2 (100·0)	..	..	..	..	..

(Figures in brackets indicate percentages.)

THE HEALTH OFFICER'S JOB IN THE CONTROL OF VIRAL DISEASES

BY

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A broad view of the communicable diseases of viral origin, this paper becomes an impres sive plea for local health department participation in field studies. still on essential ingredient in productive research.

Knowledge of viral disease came after that of bacterial infections; it also developed more slowly, with the main volume of contributions in the past ten years; it is now a rapidly expanding field. The state has been reached where technical advance has passed practical application. The popular diagnosis of the day, that the patient " has got a virus " eventually will not suffice, any more than did the older diagnosis of " a fever ".

The Health Officer is familiar with many virus diseases—smallpox, rabies and a number of the common communicable diseases of childhood; he has faced many times the problems of control and working procedures in their management have become more or less fixed. The difficulty lies in the new facts progressively brought forth about these old familiar processes, and still more in the continuing addition of new viruses, sometimes of whole new groups of viruses. To complicate matters as virologists have expressed it there are newly discovered viruses seeking a disease as well as the more orthodox situation of a disease looking for its viral agent.

The practising physician is often unfamiliar with these facts because, until recently, virology had little attention in the curriculums of medical schools. The natural move is to turn to the Health Officer for advice in diagnosis, epidemiology, and management as has been his custom in matters of communicable disease. The Health Officer needs to be informed, if for no more than prestige.

The more practical consideration is the stream of shining discoveries that continues to come off the scientific assembly line. They have accumulated faster than they have been put to use—to put them to use requires understanding of what they are and for what they are. The first item in this dissection of the job of the Health Officer in control of viral diseases becomes evident. The days of standing by in easy contemplation of this new field are over; it becomes necessary to take part in the game. In essence this means going back to school again, not formally, but with the available texts on viral diseases, of which there are several, and with the departmental journals, in most issues of which are new reports on viruses and their behaviour. The recommended course of study is attractive.

A major part of the progress in control of communicable diseases has been with infections due to bacteria and their toxic products, where antibiotics and chemotherapeutic agents have permitted a sudden surge forward. These materials have not helped greatly in the control of virus infections which remain the hard core of the communicable diseases.

Virus diseases are themselves a challenge. They include some of the most common and some of the most dangerous. Some arouse an emotional reaction beyond most morbid processes. Others are among the most curious and the most obscure, and they clearly include the main part of the newly discovered. The manual of the American Public Health Association, control of Communicable Diseases in Man, includes 20 diseases caused by known viruses and nine others in which a virus etiology is more or less strongly implicated—in all, 29 diseases of the 118 there listed. That little book has the nucleus of what is known of control measures and is drawn upon in this endeavour to derive principle.

General Control Procedure.

The principles in control of viral disease are those applicable to communicable diseases in general, although method often varies and technical procedure commonly has individuality. These principles are now examined as they relate to viral diseases and to the activities of Health Officers at State and at local level.

Field Study.—The local Health Officer has the main responsibility for control of viral and other communicable diseases. Most State Health Departments engage in few direct control activities, being concerned more with investigating unknown features of disease behaviour and the improvement of control procedures. Under any circumstances the local Health Officer is the first to see disaese in nature; its recognition depends upon his acuity; its exploration on his initiative.

A first essential is to lose the established awe of viral infections. They are no longer mysterious: more is known of some of them than of many bacterial diseases. This holds despite accumulating evidence which predicates existence of a masked problem of impressive extent, resting in numbers of unrecognized viruses continuously or periodically circulating in ordinary populations. The infections they cause are not defined clinically or etiologically.

The direct objective is those viral diseases of recognized occurrence and the need is for field studies of the Pickles variety. This Health Officer in a little English town of 285 persons, by simple observation of disease behaviour in his local community, has made repeated contributions to epidemiology and to control measures. Curiously enough, his most significant work was in viral diseases—chicken pox and herpes zoster, infectious hepatitis, and Bornholm disease. Such practical field study defines the nature and extent of the problem at hand and directs control measures. It also gives opportunity for a kind of research open to few others. The Health Officer at State level has obligations to support such observations with consultation, advice and appropriately with material aid in facilities and skilled workers. In this he furthers the particular function of his own office, just stated.

Laboratory facilities—with few exceptions, clinical means fail to establish with any certainty the etiologic identity of viral infections. Consequently, laboratory facilities assume greater importance in a control program than with most communicable processes. Practical diagnostic procedures are available for a goodly number of viruses. The first consideration here is provision of laboratory facilities, ordinarily on a State basis. These services are costly and the number of qualified workers is limited.

The more populous States have established their own laboratories and more will do so. An occasional State necessarily will have to provide individual facilities because of geographic isolation from centres where virus studies are done. In most instances the practical arrangement is to establish a working arrangement with one of the 30 co-operating labouralories of the Public

Health Service or sometimes with a University laboratory working with viruses. The immediate need is thereby promptly met and commonly at lower cost; the service is likely to be better than in a general laboratory making these examinations in connexion with other interests. Duplication of services where such arrangement is possible usually is not justified.

The local Health Officer and the physicians of his community have need to know those viral diseases for which laboratory aid exists and, equally important, those for which it does not, this being aside from the particular services provided by the individual laboratory. Simple specific diagnostic laboratory procedures are available for some 17 viral diseases. Diagnostic procedures are not available for many others, sometimes because of technical difficulties (measles): becauase a method is too costly or cumbersome for routine use (identification of specific arthropod borne virus encephalitides); because the particular disease has not passed the research state (keratoconjunctivitis); or because of its comparative rarity (Newcastle disease).

The kinds of material to collect for laboratory study and how to collect and forward them is a third consideration. Etiologic diagnosis of a viral infection depends in many instances on examination of acute and convalescent stage serums for increased antibody response (influenza),and less commonly on virus isolation (herpes simplex), or identification of antigen in vesicles or crusts of lesions (smallpox), or demonstration of morphologic structures in tissues (rabies). The Association Manual on Diagnostic Procedures for virus and Rickettsial Diseases, with a new edition shortly to appear is a useful source of information for technical method, application, and limitations. A sound clinical description of the disease, a tentative clinical diagnosis, and the attendant epidemiologic circumstances are essential features in assuring full laboratory aid, along with the appropriate specimen.

The information just listed should reach all laboratories, physicians, and local health authorities, of the State, appropriately a ajob of the State Health Officer. The preferred means are short courses or conferences on viral infections in enough areas of the state to be easily accessible to most physicians, with distribution of a prepared outline giving the essential information. Alternatively, the outline and a letter may be used.

Reporting.—The reporting of Epidemics by local health authority independently of required individual case report progressively becomes commoner procedure. The appropriate information includes number of cases, within what time, approximate population involved and apparent mode of spread. This is especially pertinent to viral diseases of irregular occurrence and to ill-defined disease of possible viral origin. Action at the State level presumably follows.

A number of States, in formulating lists of diseases requiring individual case report, are questioning the practical benefit derived from including such common viral diseases as measles, mumps, and chicken pox. Several have simplified procedure, substituted epidemic reporting and no longer require individual case notification.

Better case reporting is usually to be had by restricting official report to those disease for which control measures are provided, or potential control procedures are under evaluation, or epidemiologic information is needed for a definite purpose. This also makes feasible periodic and regional evaluation of completeness of reporting of diseases for which report is required, again another job of the State Health Officer.

Isolation.—Accumulating information permits a more exact prescription of required isolation for many of the commoner viral diseases. That for chicken pox varies greatly from state to state, despite the recommendations of the Manual of the Association on Control of Communicable Diseases in Man, with little reason for

restriction beyond the seventh day after the eruption appears. The period of communicability of mumps has been defined as a maximum of nine days after intial swelling of the parotid.

Evaluation of Control Procedures.—Many programmes for control of viral and other communicable diseases, and many of the individual measures used, necessarily rest on experience in other localities and sometimes under other conditions. Health authorities consequently face the need for evaluation of the procedure or programme followed under local conditions. The introduction of a new immunizing agent or other control measure should carry provision in the programme for the necessary records and procedure to permit assessment of its value in the sense of efficiency, acceptability, and safety. Ordinarily this will be on a sampling basis and in conjunction with health authorities, but is primarily a function of State authority.

Periodic assessment of the level of immunity of a population is a practical operation for several diseases, including some viral infections. In fact, this was first accomplished in systematic fashion for yellow fever. Influenza has been so approached in research programmes mapping the pattern of the diseases as it relates to antibody level in different population groups. With more laboratory facilities that could be done now for poliomyelitis. The procedure used by Ipsen for bacterial diseases, whereby serologic epidemiology was a measure of extent of use and past performance of an immunizing agent and in direction of future effort, has attractive possibilites for viral immunizing agents.

Extent of Control.

Attention now turns from general administrative and epidemiologic procedures for control of viral disease to what may be done in the specific instance. Control of communicable disease is loosely used to express any measurable degree of accomplishment in limiting the frequency of a transmissible infection. From a practical standpoint benefit is derived from establishing for a disease the precise and determinate limitations of what may be expected in the way of control using currently available methods. Control is relative.

Situations exist where no procedure in common use can be relied upon as a means of effective control of the disease or of epidemics; chicken pox is a good example. Control approaches an end point in effectiveness when a disease is eliminated from a region or a part of a region for long periods of time, as rabies in England or smallpox in Massachusetts, although lacking assurance that the conditions which permit its re-entry and propagation have been securely removed. Intermediate objectives can be established to advantage as a means for determining the relative emphasis to be accorded individual diseases in a general programme and to escape the useless endeavour to stretch existing measures beyond their innate capacity.

Limited control is in evidence when designed measures result over an appreciable time in a lesser frequency of cases and deaths than characteristic for that time and place; the disease persists at an established lower level. Effective control may be considered to exist when incidence oscillates along a trend line consistently directed towards lower levels, certain periodic or irregular departures from that course being accepted. Full and satisfactory control is achieved when available measures prevent a significant increase in cases and deaths under the force of material changes in environment. Tuberculosis in Europe and the United States is under effective but not complete control, as the increased rates of

the recent world war plainly demonstrated. Viral diseases may be grouped according to this scheme as a guide to control efforts.

Control Ineffective.—First, a number of viral diseases are to be firmly set aside as offering no possibility of practical control by methods now in common use; rubella and chicken pox are examples. With primary a typical pneumonia, the common cold and other acute upper respiratory infection, herpangina and pleurodynia, general measures directed towards crowding and increased aggregation of people, the promotion of resistance through optimal diet and rest, and the attempt to limit transmission by voluntary isolation or rest in bed are reasonable procedures, but with no promise of material result. The control of infectious mononucleosis, keratoconjunctivitis, and a number of other infections of presumed viral origin is within the province of research rather than practice. For mumps active immunization offers partial control under special circumstances, as aggregated young adults, but scarcely in respect to general populations.

Ecologically Excluded.—Under present conditions Health Officers of the United States can eliminate a second group of viral diseases from practical planning. Phlebotomus or sandfly fever and Rift Valley fever are not known to have occurred in nature in this country; yellow fever and dengue fever have long been absent. With the reservation that the last two are not wholly outside probability—complacency is unwarranted and warning has recently been sounded about yellow fever—the group may be dismissed from practical calculation in most parts of the country.

Practical Obligation—Control measures for a third group are established with sufficient certainty to assure practical accomplishment and to require inclusion in any public health programme. The anticipated result is uneven from one disease to another, but the diseases themselves are broadly prevalent and in some instances are of relatively frequent occurrence.

Smallpox vaccination presents a situation where the extent of control is limited only by the effort expended. If man has the capacity to eradicate an infectious disease from the human population, smallpox seemingly is that disease. Vaccination suffices as a method, but a goodly corps of public health nurses would be needed to persuade the diffident and recalcitrant, along with assistants of bulk and muscle having authority to deal with those who would not respond to reason. Any community can control its smallpox rate.

Immune serum globulin serves usefully in infectious hepatitis although not in serum hepatitis. Family contacts given 0·01 ml. per pound of body weight intramuscularly and promptly after exposure are passively protected even as late as six days before onset of disease and for from six to eight weeks. This is recommended as regular practice because the secondary attack rate in family groups is high; the long incubation period makes the procedure practical. Mass immunization of limited communities, schools, and institutions is not so much a question of value as of indication for its practice. Outbreaks are commonly protracted, sometimes over two or three years, and of slow evolution rather than explosive. A comprehensive experience shows more than two-thirds of school outbreaks to end with a single case. In the absence of multiple primary cases, a practical procedure is to institute such mass protection on appearance of the first secondary cases, the usual incubation period being about 25 days. days.

Poliomyelitis is clearly in the list of viral diseases requiring universal attention of Health Officers, first because of public concern, but mainly because poliomyelitis vaccine has increased the probability of what may be accomplished in control of the disease. Advice about this immunizing agent has come from all sides and recommendations are often conflicting. An analysis of the evidence is beyond the compass of this presentation but a statement of

position is made. Though the present poliomyelitis vaccine is rather surely not the best vaccine that will be produced, the comprehensive field trial of an experimental poliomyelitis vaccine in 1954 proved that particular vaccine to be an efficient immunizing agent; it reduced the incidence of paralytic poliomyelitis and careful observations attested its safety within practical limits.

Large-scale production of the vaccine for general use brought question of the safety of the product so produced and the Idaho experience proved that question to be well grounded. Technical changes and added safety controls were subsequently introduced. There is risk in administration of any biological agent. Even smallpox vaccine has such risk, but when profit exceeds loss to the extent that it does with small-pox vaccination marginal risk is justified. The risk with the present inactivated poliomyelitis vaccine is in persisting living virus; the risk extends past the person inoculated to contacts and associates. A broad experience with the vaccine now in use indicates a practical level of safety despite theoretical considerations of a potential danger; the evidence has yet to be brought together through field evaluations.

That the changes made in production also maintain antigenic effectiveness at the established levels of the field trial is yet to be demonstrated; evidence is simply lacking one way or the other. Time is needed to determine the duration of immunity, the need for booster injections and their spacing, all of which are features determining the acceptance and usefulness of vaccination. The experience thus far available is largely with school children, with suggestion that immunizing efficiency has a relation to increasing age which is not unexpected. An ultimate programme for control through vaccination would seem to centre on the pre-school group as in most other instances; information about their reaction is essential.

Research toward an improved vaccine continues. Such common sense measures in prevention and control as exist, and they are few, are not to be discarded. Poliomyelitis is not conquered but advances have been made toward its control, more in recent years than in the past half century. Enough is known of the efficiency of inactivated poliomyelitis vaccine to justify its continued use with collection of data having the aim to determine some of the stated unknowns; a calculated but presumably minimal risk is recognised. Much unfinished business remains about poliomyelitis immunization before it becomes a fully authenticated control measure.

Rabies control, through measures relating to dogs and by immunization of persons bitten by dogs, is an established function of local and State Health authority. The Colorado studies in management of dog rabies, the addition of hyperimmune serum as a means for protecting human beings suffering dog bite, and improved preparations for immunization of dogs are developments with this old virus disease needing extended test and evaluation in field practice. Area control of rabies in co-operation with appropriate wildlife conservation, and livestock sanitary authorities is as much a research as a control activity. As one State Health authority expressed it, fox trapping, skunk poisoning, and bat studies may appear far removed from human welfare, but identification of the reservoir of rabies and the relation of wildlife to the domestic animal population are fundamental to control.

Unfulfilled opportunity.—Accumulated studies of many years and frequently repeated emphasis still have failed to give general appreciation that the fatality from measles of infants and children under three years of age is unduly excessive. Those in ill-health, including older children, have particularly high rates. Protection with gamma globulin is effective. Supplies are now adequate and the procedure is less cumbersome than use of convalescent

serum or serum of healthy adults; thus little excuse exists for the common lack of emphasis on this feature of control of viral diseases.

Active immunization against influenza with currently available vaccines achieves a substantial reduction in incidence, provided the prevailing strain of virus matches closely the antigenic components of the vaccine used. Opinion differs on duration of protection but immunization oftener than once a year appears unnecessary. Major shifts in antigenic structure of influenza virus occur and discount the effectiveness of general immunization of whole populations. The use of influenza vaccines under controlled conditions is increasingly practiced for selected groups but has not been promoted to the extent that the procedure warrants.

Regional and limited problems.—A number of other viral diseases of the United States are of regional concern or, if general, are of limited frequency. Psittacosis is such a regional problem geographically because certain States have long been involved more than others; it is a regional problem administratively for under present regulations each State determines its own control practice. The disease is rare, clinically serious, but antibiotic and chemotherapy are effective beyond results with most viral infections. The demonstration of barnyard fowls and pigeons as sources of infection has broadened the problem of control, and at the same time lessened the attention to psittacine birds kept as pets. That deficiencies in control can be cancelled out by chemotherapy is a fortunate circumstance but scarcely to be taken as a substitute. Currenly, psittacosis is a minor public health problem but the pandemic of 1930 is not to be forgotten, particularly in those States with established residual infection.

Colorado tick fever is an uncommon and relatively inconsequential disease even in affected areas which are the Mountain and Pacific Coast States of the Western United States. Trachoma is mainly a viral disease of the southwest and of the Indian population. Lymphogranuloma venereum has a primary distribution in the Southern States and in the Negro population, although clearly of wider spread and probably in numbers greater than ordinarily believed.

Lymphocytic choriomeningitis has as its peculiarity a dominant presence in city populations. Sporadic cases are known to appear within a city block over months or years as the virus becomes established in the mouse colony of the area. The disease is widespread and not as rare as recognised cases indicate. Some thousand cases were reported among American troops of World War II in both this country and overseas; with due regard for inaccurate diagnosis this disease seemingly warrants greater regard than usually accorded.

A group of diseases collectively known as the arthropod borne viral encephalitides is perhaps the most important member of this group. Eastern and Western equine and St. Louis types are recognized infections in the United States. Prevalence is in summer and early fall, commonly limited to areas and years of high sustained temperature and many mosquitoes. Infection is irregularly epidemic in dry farming areas of the midwest, southwest, and east and has persisted for successive years in hot irrigated western valley regions of the United States. The greatest incidence is in rural and suburban areas.

Most of the viral diseases in this category have control measures of appreciable value, particularly those transmitted by arthropods. The required attention in a programme for control depends upon knowledge of the local situation, for this varies from one State to another.

Summary.—The continuing addition of new viruses to the list of infectious agents of disease in man, and sometimes of whole new groups with complicated health relationships, discredits any idea that the communicable diseases have been conquered. Full data on the behaviour of the communicable diseases in World War II are just becoming available. Of specific infectious and parasitic diseases, 27·3 per cent of reported cases were caused by viruses. Death from viral disease among all deaths

of the group was 20 per cent. If cases of viral disease, including disease presumably due to viruses, are placed in relation to all communicable disease, notably with common respiratory disease added, the proportion of viral disease to the whole measurably exceeds one-half.

No other major segment of our social system has records of health and disease equivalent to those of the military services, particularly in relation to morbidity and permanent disability. The communicable diseases accounted for approximately half the total incidence of disease in Army troops of the last Great War. Deaths from disease were only 5·1 per cent of all casualities compared with 75·2 per cent for battle casualities and 19·7 per cent for non-battle injury. Disability was in inverse proportion; 85 per cent of disability was due to disease with 15 per cent distributed between the other two categories. Man-days lost in round numbers were 285,918,000 from disease, from injuries 59,863,000 and from battle casualities 72,000,000. The evaluation of a disease by the deaths it causes has always been a measure of expediency; deaths often provide the only reliable data. For many diseases, deaths are no longer as good an index of total health significance as they once were; the antibiotics and chemotherapy have introduced in element not necessarily reflected in frequency of cases and the associated disability and residual defect. Also the old view still prevails that disease that does not kill is scarcely worthy of note. The Army data are informative in that they present evaluation of the communicable diseases in terms of total effect—deaths, defect and disability. Judgment is too often on the sole criterion of death.

These same Army data, representing as they do Amercican experience in most parts of the world, further demonstrate that to consider the communicable diseases as a problem outmoded, as a feature of bygone days, is at best provincial. In other countries, which include half the world population, the communicable diseases rank first among causes of death, aside from the costs of disability and residual defect. One or other of the six great pandemic diseases specified as quarantinable invaded every theatre of operations and home troops as well; the need for vigilant control is evident. The infectious and parasitic diseases were two and a half times as frequent in troops of the China-Burma-India theatre as in troops of continental United States. Mortality had a still greater spread. Control measures evaluated on experience in America are not always so effective in other parts of the world, even when applied to an American population by American physicians.

As the practice of preventive medicine enlarges and as the composition of populations changes, neoplastic and degenerative diseases, mental disorder and traumatic injury are properly incorporated in public health programmes. The gains in control of communicable diseases often permit more effect in these other fields. But fairly judged by the temporary and lasting disability they cause, the deaths that result, and the contribution they make in ultimate causation of these other conditions, the infectious diseases, remain the backlog of the public health programmes. There is the further consideration that the communicable diseases are the place to learn the trade of disease control; more is known of their epidemiology than for any other mass disease.

The viral infections continue to provide new problems in replacement of those others of the communicable diseases which approach solution. They constitute a major and growing part of the total, warranting a firm place in operational public health. Added facilities and special staff are sometimes a need but the main requirement of the health officer is to turn the defined principles of communicable disease control to this end; acquire a reasonable familiarity with such strange fellows as the APC viruses, RI—67, Coxsackie, and the others; and through field study of viral diseases in nature accept the responsibility of contributing to this new knowledge as well as using it.

சென்னை மாநிலத்தில் தாய்மை குழந்தை நலப் பாதுகாப்பு திட்டங்கள்.

பி. ஜி. கேசவேலு, எம்.பி.பி.எஸ்., பி.எஸ். எஸ்ஸி., எம்.பி.எச். (கொலம்பியா),
சுகாதார விளக்க அலுவலர், பொது நலத்துறை, சென்னை.

நாட்டின் வளப்பமும், வளர்ச்சியுற்ற மக்களின் வாழ்க்கை நிலையும், அந்நாட்டில் பிறக்கும் குழந்தைகளின் நல் வாழ்வைப் பொருத்தே இருக்கும். காரணம், இன்றையக் குழந்தைகளே இந்நாட்டின் வருங்காலக் குடிமக்கள். குழந்தைகளின் நல்வாழ்வோ, அவர்களை ஈன்றெடுக்கும் தாய்மார்களின் உடல் நலனை யொத்தே இயங்குவதாகின்றது. ஆகவே, இளம் பருவத்தினரான குழந்தைகளும், தாய்மையுறும் பெண்களும் அக்கறையுடன் பாதுகாக்கப்படவேண்டியவர்கள். கருவுற்றிருக்கும் தாய்மார்களைப் பராமரிப்பது சமுதாயத்தின் முக்கிய உறுப்பினரான பெண்களைப் பராமரிப்பதோடல்லாமல், அவர்கள் பெற்றெடுக்கும் குழந்தைகளையும் பாதுகாப்பதாகும். சாதாரண நிலையில் உடல்நலக் குறைபாடுகள் ஏதுமின்றி வாழும் பெண்கள், கருத்தறிக்கும்போது எதிர்பாராத இன்னல்களுக்குள்ளாக நேரிடுகிறது. கருவுற்ற நிலையில் உடல் நலம் பாதிக்கப்பட்டால் தாய்கள் மட்டுமன்றி குழந்தைகளும் அல்லல் படுகின்றனர். சில வேளைகளில் அவர்களுக்கு உயிர்ச்சேதமும் விளைகிறது. பிரசவத்தால் தாய்களின் உடல்நலம் நிரந்தரமாகப் பாதிக்கப்பட்டாலோ குடும்ப வாழ்க்கையேசீர் குலைந்து விடுகிறது.

பெற்றோராக விரும்பும் ஆணும் பெண்ணும் குடும்பத்தை நடத்தத்துவங்கும் போதிலிருந்தே சிந்திக்கப்படவேண்டியது தாய்மை நலப்பாதுகாப்பு. கருவில் உதித்த அன்றிலிருந்தே துவங்கப் படவேண்டியது குழந்தை நலப்பாதுகாப்பு. கருவுற்றிருக்கும் தாயின் உடற்கூறு, உணவு ஊட்ட நிலைகள், மன அமைதி முதலியவற்றைக் கவனித்தலும், பிரசவ காலத்திலும் அதன் பின்னும் வேண்டிய மருத்துவ உதவி அளித்தலும், குழந்தைகளின் உடல் வளர்ச்சிக்கும் உள்ளப் பண்பாட்டிற்கும் ஆவன செய்தலும், அப் பருவங்களில் ஏற்படும் நோய் நொடிகளைத் தடுத்து அவர்கள் நீடூழி காலம் வாழ வழி வகுத்தலும், தாய், சேய் நலப்பாதுகாப்புத் தத்துவத்தின் புதிய கருத்துக்களாகும். இதனால் குழந்தைகளையும், தாய்மார்களையும் நேரிடையாக மட்டும் பராமரிப்பது போதா தென்பதோடு, அவர்களுக்கு அடிப்படை சுகாதார வசதிகள் அனைத்தும் ஒருங்கே அமைத்துக் கொடுத்தாலன்றி, எளிதில் தவிர்க்கக்கூடிய நோய் நொடிகளினால் அவதியுற்று அல்லல் பட நேரிடுகிறது என்பது நன்கு விளங்கும். தொத்து நோய்களாலும், அகாலப் பிரசவங்களாலும், அங்கக் குறைவுப் பிறவிகளாலும், உணவு ஊட்டக் கோளாறுகளாலும். பலப்பல குழந்தைகள் பிறந்த சிறிது காலத்திற்குள்ளாக இறந்து படுவதைக் காண்கிறோம். இறக்கும் குழந்தைகளில் கால்பங்கு பிறந்த ஒரே வாரத்திலும், மற்றொரு கால்பங்கு பிறந்த ஒரே மாதத்திற்குள்ளும் தவறி விடுகின்றன. பிரசவத்தின் விளைவாகத் தாய்களும் பாதிக்கப்படுகின்றனர். நோய்க்கிருமிகளின் தாக்குதல்களாலும், உதிரக்கோளாறுகளாலும், உதிரப்பெருக்காலும் பலர் தவிப்பதன்றி, சிலர் உயிர் இழக்கவும் நேரிடுகிறது.

தாய் மரண விகிதமும், சேய் மரண விகிதமும், தாய், சேய் நலனைக் குறிக்கும் அளவுக்கோல்களாக விளங்குபவை. பிரசவகாலத்திலும், அதனை யொட்டி ஒரு மாதத்திற்குள்ளும், ஆயிரம் பிரசவங்களின் விளைவாக உயிரிழக்கும் தாய்மார்களின் எண்ணிக்கையே தாய் மரண விகிதம் எனவும், உயிருடன் பிறந்த ஆயிரம் குழந்தைகளில், ஓராண்டு முடிவதற்குள் இறந்துவிடும் குழந்தைகளின் எண்ணிக்கையே சேய் மரண விகிதம் எனவும் சொல்லப்படுகின்றன. இந்த நூற்றாண்டின் துவக்கத்தில் சேய் மரண விகிதம் ஐந்நூறாகவும், தாய் மரண விகிதம் முப்பதாகவும் இருந்தன. அதாவது, உயிருடன் பிறந்த ஆயிரம் குழந்தைகளில் ஐந்நூறு குழந்தைகளும், பிரசவித்த ஆயிரம் தாய்மார்களில் முப்பது தாய்களும் இறந்து விட்டனர் என்று அறியக்கிடக்கிறது. இவை யாவும் வீணான உயிர்ச்சேதங்கள் என்பதில் ஐயமில்லை. 1920-ம் ஆண்டில் சேய் மரண விகிதம் முந்நூறாகவும், தாய் மரண விகிதம் இருபதாகவும் இருந்தன. 1940-ம் ஆண்டிற்குள் சேய் மரண விகிதம் நூற்றறுபதாகவும், தாய் மரண விகிதம் பத்தாகவும் குறைக்கப்பட்டன. 1954-ம் ஆண்டில் சேய் மரண விகிதம் நூறாகவும், தாய் மரண விகிதம் ஐந்தாகவும் குறைக்கப்பட்டுள்ளன. ஐம்பது ஆண்டுகளுக்கு முன்பிருந்த சீர்கெட்ட நிலையிலிருந்து நாளடைவில் நாம் அடைந்துள்ள தேற்றம் திருப்திகரமானதென்று ஒருவாறு பெருமிதம் அடையலாம். எனினும், முற்போக்கான மேல்நாடுகளுடன் நம் நாட்டின் நிலையை ஒப்பிட்டுப் பார்த்தால் மகிழ்ச்சிக்குரியதொன்றுமில்லை என்பது விளங்கும். மேல்நாடுகளின் தாய், சேய் மரண விகிதங்கள் நமது விகிதங்களைக் காட்டிலும் ஆறில் ஒரு பங்காகக் குறைக்கப்பட்டுள்ளன எனபதைச் சிந்தித்து, நாம் மேலும் செயலாற்ற வேண்டும்.

தேவைக்கேற்ற மருத்துவ வசதிகளும், பிரசவ நிலையங்களும் அமைக்கப்படவில்லை யென்னும் காரணத்தாலும், போதிய அளவுக்கு வைத்தியர்களும் மருத்துவ உதவியாளரும் கிட்டவில்லை யென்ற குறையாலும், அறியாமையாலும் அக்கறையின்மையாலும் மக்கள் இன்னும் நாட்டுப்

பெண்களையே நாடிச் செல்வதாலும், எண்ணற்ற கருச்சேதங்கள் விளைவதோடு மட்டற்ற மானிட முயற்சிகளும் வீணாகின்றன. இன்றைய நிலையில், நான்கில் ஒரு பங்குப் பிரசவங்கள்தான் தேர்ச்சிப் பெற்ற மருத்துவ உதவியாளர்களால் பராமரிக்கப் படுகின்றன. மீதியுள்ள நான்கில் மூன்று பங்குப் பிரசவங்கள் இன்னும் நாட்டு மருத்துவர்களாலும், நாவிதப் பெண்களாலுமே கண்காணிக்கப்பட்டு வருகின்றன. பயிற்சி பெற்ற மருத்துவ உதவியாளர்களின் எண்ணிக்கையை மொத்தப் பிரசவ எண்ணிக்கையுடன் விகிதாச்சாரபடி ஒப்பிட்டுப் பார்த்தால், எழுநூறு பிரசவங்களைப் பராமரிக்க, இப்போதுள்ள நிலையில், ஒரே ஒரு மருத்துவ உதவியாளர்தான் இருப்பதாகக் காண்கிறோம். சராசரியாக நூறு பிரசவங்களைக் கவனிக்க ஒரு மருத்துவ உதவியாளராவது கிட்டும் வரையில் முன்னேற வழியில்லையெனத் தெளிந்துரைக்கலாம். பிரசவத்தின் போதும், அதற்கு முன்னும் பின்னும் மருத்துவ உதவியை ஒவ்வொருவரும் பெறமுடியுமானால் மேல்நாடுகளில் அடைந்துள்ள வளம்பெற்ற நிலையை நாமும் அடையக் கூடும். பெருவாரியாக மருத்துவர்களுக்கும் தேர்ச்சி அளிப்பதும், தேவைக் கேற்ப பிரசவ நிலையங்களையும் பிறசாதனங்களையும் அமைத்துக் கொடுத்தலும், மக்களுக்கு சுகாதார உணர்ச்சியை ஊட்டலும், தாய், சேய் நலப்பாதுகாப்புத் திட்டத்தை நன்கு விரிவுப்படுத்தலுமே அத்தகைய முன்னேற்றம் காண வழிகளாகும்.

சென்னை மாநிலத்தின் தாய், சேய் நலப் பாதுகாப்பு இயக்க வரலாற்றை நோக்கும்போது, மக்களிடையே முனைந்து ஆதரவைத் தேடி இயக்கத்தில் ஈடுபடச் செய்வித்த நற்பணி சில பல பொது நல ஊழியர்களையே சாரும் என அறிகிறோம். இந்நற்பணியாற்ற, சிலர் கூடி, **1919**-ம் ஆண்டில் சென்னை மாநில சுகாதாரக் குழு ஒன்றை அமைத்தனர். செஞ்சிலுவைச் சங்கமும் ஊக்கத்துடன் உழைத்து ஏனைய சங்கங்கள் பின்பற்ற வழிகாட்டியாக உதவியது. தாய்மையுற்ற பெண்களை வீடு தோறும் சென்று மருத்துவர்களைக் கொண்டு பார்வையிடச் செய்த இயக்கம், முதன் முதலில் சென்னை நகராட்சி மன்றத்தாரால் துவக்கப்பட்டது. இதன் தேவைக்காக மருத்துவ நல மேற்பார்வையாளர்களைப் பயிற்றுவிக்க ஏற்பட்ட திட்டம், அக்காலத்திலேயே துவக்கிய மற்றோர் முயற்சியாகும். தாய், சேய் நலப் பாதுகாப்பு இயக்கத்தின் அவசியத்தை சென்னை மாநில உள்ளாட்சி மன்றங்கள் உணரத் தாமதப்பட்டமையால், **1931**-ம் ஆண்டில் தாய், சேய் நலப்பாதுகாப்பு அலுவல் பிரிவு, பொது நலத் துறையின் ஓர் பிரிவாக இணைக்கப்பட்டது. இப்பிரிவு, உள்ளாட்சி மன்றங்களுக்கு யோசனை கூறவும், பிரசவ நிலையங்களை ஆரம்பிக்கவும் உதவி புரிந்தது. இவ்வாறு உருவாகிய திட்டத்தின் முயற்சியாலும், அரசாங்கத்தின் ஆதரவாலும், முதல் ஐந்தாண்டுத் திட்டம் பிற பல திட்டங்களின் உதவியாலும், இன்றுவரை, சென்னை மாநிலத்தில் **64** பிரசவ விடுதிகளும் **704** தாய், சேய் நலப் பாதுகாப்பு நிலையங்களும் அமைக்கப்பட்டிருக்கின்றன. இந்நிலையங்களில் எண்பத்தெட்டு பெண் வைத்தியர்களும், நூற்றெழுபத்தைந்து மருத்துவ நல மேற்பார்வையாளர்களும், ஆயிரத்துப் பதினென்கு மருத்துவ உதவியாளர்களும், ஆயிரத்துப் பதினென்கு ஆயாக்களும் பணியாற்றி வருகின்றனர். இவர்கள் அனைவரும் நன்கு தேர்ச்சி பெற்றவர்கள். புதிய விஞ்ஞான மருத்துவ முறைகளை இவர்களுக்கு அறிமுகப்படுத்துவதற்காக அவ்வப்போது மறு பயிற்சி அளிக்கப்படுகிறது.

தாய், சேய் நலப் பராமரிப்புக்கென உள்ளாட்சி மன்றங்களும் பொது ஊழியக் குழுக்களும் ஆண்டு தோறும் பனிரண்டரை லட்ச ரூபாய்கள் செலவு செய்கின்றன. இந்தச் செலவில் கால் பங்கை சென்னை அரசாங்கம் மானியமாகக் கொடுத்துதவுகிறது. அத்துடன், நூற்று ஐம்பத்தேழு தாய், சேய் நல நிலையங்களை அரசாங்கமே எடுத்து நடத்துகிறது.

இவையன்றி, மாநிலத்தின் பிற்பட்ட வட்டாரங்களின் தாய். சேய் நலப்பாதுகாப்பிற்காக, மத்திய அரசாங்கத்தின் உதவியுடன் மாநில அரசாங்கம் புதியதொரு திட்டத்தை வகுத்திருக்கிறது. இதன் விளைவாக, **1955-56**-ம் ஆண்டில் இருபத்தாறு தலைமை நிலையங்களும், ஒவ்வொரு தலைமை நிலையத்துடன் இணைக்கப்பட்ட நான்கு உப நிலையங்களும் அமைக்கப்பட்டுள்ளன.

தாய்மை நிலை அடைந்த பெண்கள், குழந்தைகள் இவர்களது நல வாழ்விற்கு உணவு ஊட்ட நிர்ணயங்கள் அடிப்படையாதலின், சர்வ தேசீய ஸ்தாபனங்களாகிய உலக நலக் குழு, யூனிஸெப்ஃ முதலியவற்றின் உதவியுடன், சென்னை அரசாங்கத்தார், பால் உணவு, உயிர்சத்துள்ள வைடமின்கள், மற்றும் பல ஊட்டப் பொருள்களை இவர்களுக்கு இலவசமாக வழங்கி வருகின்றனர்.

மேற்கூறிய அரும் பெரும் சாதனைகளை நாம் அடையப்பெற்றது சமீப காலத்தில்தான். போதிய அளவிற்கு இல்லையெனினும் இதுவரை நாம் அடைந்துள்ள முன்னேற்றம் மகிழ்ச்சிக்குரியதாகும். இவ்வாறு பயன் பெற ஊக்கமளித்து, உணர்ச்சியூட்டி, வழிகாட்டியாக அமைந்தவை நாம் மேற்கொண்டுள்ள ஐந்தாண்டுத் திட்டங்களும் பிற திட்டங்களுமேயாகும்.

வருங்காலத்தில் இத்துறையில் செயலாற்ற வேண்டியுள்ளவை சிந்தனைக்குறியன. இப்பொழுதும் நூற்றுக்கு எழுபத்தைந்து பிரசவங்கள் வரை, சுகாதாரத் தத்துவங்களை அறியாத, மூடப் பழக்க வழக்கங்களில் உழலும் கிராமாந்திரப் பெண்களாலும் பிறராலுமே கவனிக்கப்பட்டு

வருகின்றன. சுகாதார விதிகளுக்குப் புறம்பாகப் புலப்பட்டாலும், இவர்களைப் போன்ற பரம்பரை மருத்துவர்களுக்கு ஓரளவுக்கேனும் பயிற்சி அளித்துப் பயன் பெறுவது தான் சாத்தியமானதென்று காணக்கிடக்கிறது. ஏனெனில், பரம்பரை நாவிதப் பெண்கள் அனைவருக்கும் பதிலாக பயிற்சி பெற்ற மருத்துவர்களை ஏற்பாடு செய்து மாற்றிவிடுவதென்பது எளிதில் இயலாத காரியம். தவிர, நன்கு பயிற்சி பெற்ற மருத்துவர்கள் வாழ்க்கை வசதிகள் மிகுந்துள்ள பட்டண வாசத்தை விட்டு விட்டு கிராமாந்தரங்களில் குடியேறிப் பணிபுரிவார்கள் எனறு நம்புவதற்கில்லை. ஆகவே, பாமரப் பரம்பரை நாட்டுப் பெண்களுக்கு அடிப்படை சுகாதார அறிவையும் விளக்கங்களையும் கற்பிப்பதோடு, தாய், சேய் நலப்பாதுகாப்பு முறைகளின் மூலாதாரக் கருத்துக்களையும் உணர்த்துவோமானால், எண்ணற்ற உயிர்ச் சேதங்களை அவசியம் தடுக்கமுடியும். தாய், சேய் நல வளர்ச்சிக்காக, இரண்டாம் ஐந்தாண்டுத் திட்டத்தில், மேற்கூறியவாறு பரம்பரை மருத்துவர்களுக்கு அரையாண்டுக் காலப் பயிற்சி அளிக்கத் தீர்மானிக்கப்பட்டுள்ளது.

இரண்டாம் ஐந்தாண்டுத் திட்டத்தின் மற்றொரு குறிக்கோள் என்னவெனில், திட்ட முடிவு காலத்திற்குள் அறு நூறு தாய், சேய் நலப் பாதுகாப்பு நிலையங்களை ஏறக்குறைய 22 லட்சம் ரூபாய் செலவில் ஏற்படுத்துவதாகும்.

தாய்மை, குழந்தை நலப் பராமரிப்பிற்கு "பொது நல நர்சுகள்" எனப்படும் தனிச் சிறப்புள்ளதொரு மருத்துவத் தொகுதியினரை இந் நாட்களில் உலகெங்கும் அமைத்து வருகின்றனர். மருத்துவ உதவியாளர்கள் மருத்துவ நல மேற்பார்வையாளர்கள் முதலியோரைக் கண்காணிப்பதற்கும், மக்களுக்கு சுகாதார வழிகளையும் விளக்கங்களையும் அறிவுறுத்தும் ஆலோசனையாளர்களாகவும், தாய், சேய் நல இயக்கத்திற்கும் மக்களுக்குமிடையே நெருங்கிய தொடர்பை உண்டாக்கும் ஊழியர்களாகவும் பொது நல நர்சுகள் பணியாற்றுகின்றனர். இத்தொகுதியினரைப் பயிற்றுவிக்க, சமீப காலத்தில் அரசாங்கத்தார் ஒரு பயிற்சிக்கூடம் நிறுவியிருக்கின்றனர். தேவையான அளவுக்கு வைத்தியர்கள் இல்லாத குறையை பொது நல நர்சுகளை ஏற்பாடு செய்வதன் மூலம் ஒருவாறு நீக்க ஏதுவாகும்.

நாட்டின் முன்னேற்றத்திற்காக, வரையறுத்த மக்கட்பேறு இயக்கத்தை சென்னை அரசாங்கம் ஆரம்பித்திருப்பது போற்றத்தக்கது. வரையறுத்த மக்கட்பேறு திட்டமும், தாய், சேய் நலத் திட்டமும் நேரிடைத் தொடர்பற்றதாகத் தோன்றினாலும் ஒன்றோடொன்று இணைந்தே நிற்கின்றன. எவ்வாறு கரு உற்பத்தியாகிறதென்று அறிந்து கொள்வது, திட்டமிட்ட குடும்ப வாழ்க்கையின் நன்மைகள் யாவை என்று புரிந்து கொள்வது, சிறிதளவுக் குடும்பத்தைச் சீராக அமைப்பதன் மூலம் தாய்க்கும், சேய்க்கும் நல் வாழ்வை அளிப்பது, இவைபோன்ற அரிய கருத்துக்களை தாய், சேய் நல நிலையங்களின் வாயிலாக மக்களிடையே விரிவாகப் பரப்புவதால், சோர்ந்துபட்ட சமுதாயத்தைச் சிறப்பாக அமைக்க இயலும் என அறியக்கிடக்கிறது.

தாய், சேய் நலனில் மத்திய, மாநில அரசாங்கங்களும், உள்ளாட்சி மன்றங்களும் பெரிதும் அக்கறை செலுத்தி வருகின்றன எனக் கூறுதல் மிகையாகாது. நோய்வாய்ப்படுவதாலும், உயிர்ச் சேதமுறுவதாலும் நேரிடக்கூடிய பொருளாதார விரயங்களைத் தவிர்க்க முடியுமென அரசாங்கத்தார் நன்கு உணர்கின்றனர். அதற்காக, தேவையான அளவுக்கு மருத்துவ சாதனங்களை அமைத்துக் கொடுப்பதற்கும், வேண்டிய அளவுக்கு மருத்துவ நலப்பணியாளர்களை ஏற்படுத்துவதற்கும் பெருமளவில் பணத்தை ஒதுக்கி வைத்திருக்கின்றனர். எனினும், மக்களின் தீவிர ஆதரவில்லாமல், மறுமலர்ச்சிக்காக மாறுபட்ட வாழ்க்கைத் தத்துவத்தை அவர்கள் ஏற்றுக் கொள்ளாத வரையில், ஆதாரமற்ற பழக்க வழக்கங்கள் மூட நம்பிக்கைகள் இவற்றைத் தகர்த்தெறியாத வரையில் முன்னேற்றம் என்பது முயற்கொம்பேயாகும். மக்கள் குலத்தின் அன்பு வித்தாகிய குழந்தை, அந்த வித்தினை இந்தப் பரந்த உலகில் நிலை நாட்டும் தாய்—இவர்களைப் பேணிப்பாதுகாப்பதைவிட செயற்கரிய சேவை வேறொன்றுமில்லை. இவ்வரிய சேவையில் ஈடுபட்டிருக்கும் அரசாங்கத்துடன் மக்கள் மனதார ஒத்துழைக்கக் கடமைப்பட்டிருக்கின்றனர்.

—By courtesy—A.I.R., Madras.

HEALTH EDUCATION.

[From Alumni Association Bulletin—All-India Institute of Hygiene and Public Health, Vol. II, No. 4, April 1956.]

Health education is a new addition to the armamentarium of the public health worker in this country, to combat disease and ill-health. It is a very important addition in that it tends to make the people more health conscious and imposes upon them the responsibility for action to protect, preserve and promote their own health and that of the community. Health education also makes the people more self-reliant, and persuades them to act when the need arises and not wait until some external agency comes to their aid. This is in keeping with the trends in the country as exemplified in the community development projects.

There are three phases in a health education programme. The first is the giving of knowledge, the second developing the right kind of attitudes; these are expected to result in improved practice. In practice, however, K. plus A. does not give P. and health educators all over have felt that some other thing which acts like a catalyst is required to complete the reaction. This is motivation and it is a very strong factor in any form of human activity. In our country, so far, the emphasis has been on giving knowledge; with the newer ideas of health education and with more and more health educators working in the field it is hoped that attitudes and motivation will be given their rightful place in health education programmes.

There has been considerable activity in this field in the last ten years. The Health Survey and Development Committee recommended the establishment of Health Publicity Bureaus within the Central and Provincial health departments. The committee also recommended the strengthening of the existing organizations with properly trained staff and equipment. The Planning Commission in the First Five-Year Plan reiterated the recommendation of the Bhore Committee. During the first plan period the Central Health Education Bureau has been established within the Directorate-General of Health Services. To indicate the importance that the centre gives to this aspect of Public Health, an Assistant Director-General of Health Services is to be in charge of this Bureau. It is hoped that all States will follow the lead given by the Central Ministry of Health.

At the All-India Institute of Hygiene and Public Health too there has been considerable increase in health education activities. The most important is the creation of a sub-section within the Section of Public Health administration. A Visiting Professor assigned by the W.H.O. and his national understudy are the staff members. The D.P.H., L.P.H. and D.M.C.W. students who were spending about three hours in health education prior to 1953, now devote 25 hours in the Institute and two days at Singur learning the theoretical aspects of health education and translating them to practice. The Public Health nurses spent forty hours in the theory and practice of health education. Health education, as it rightfully should, is included in the curricula of all the courses offered by the Institute.

The latest development at the Institute is the establishment of a certificate course in health education lasting three months. This course gives an orientation in health education to persons currently employed in health, education and development departments. The first course is due to start in June this year and the response has been very encouraging. Two such courses are to be given every year. The next logical sequence is to establish a diploma course in health education to train professional health educators. Plans are still being considered and we hope that they will be a reality soon.

The Second Five-Year Plan is laying more stress on health education. It is hoped that our alumni who are situated in strategic positions will come forward to give the necessary leadership in health education.

INFECTIOUS HEPATITIS.

[From 'Journal of the Indian Medical Association', Volume 27, No. 1, July 1956.]

The disease apparently exists all throughout India in an endemic form more commonly in children. It is, however, the recent epidemic of Delhi that has brought it before lime light. This sharp explosive outbreak, which is the feature of water-borne epidemics of infectious hepatitis, has aroused, general apprehension.

Such water-borne outbreaks have, however, been reported in the literature on several occasions in the past. For example, an outbreak of jaundice, which followed a few weeks after a water-borne outbreak of bacterial food poisoning, was described in 1931. An explosive outbreak of infectious hepatitis, showing a very high attack rate, was described in 1945. In this epidemic the infection was possibly transmitted by well-water, which showed heavy faecal pollution. In another epidemic, which broke out in some units of the American Army in Italy, it was again well-water which was the probable source of infection. In 1947 a water-borne epidemic in guests at a hotel in Swedan was described.

That drinking water can transmit infectious hepatitis has been shown by transmission experiments in human volunteers. Occurrence of infectious hepatitis in these human subjects has furnished convincing evidence of the presence of the causative virus in the water drunk by them. By the same nature of experiments it has also been found that the virus of infectious hepatitis can survive chlorination to the extent of 1 p.p.m. of chlorine for over 30 minutes and is only somewhat attenuated by 15 p.p.m. The virus also resists heating at 55° C for over one hour.

It is also these human transmission experiments that leave no doubt that fæces of the infected contain the infective agent. Studies on an outbreak in an orphanage lasting over a period of eight years also support the view that close contact with fæcal material is the common mode of infection.

Nevertheless, the mere fact of fæcal pollution of water would not necessarily indicate the inevitability of an outbreak of infectious hepatitis. If it were so, Calcutta would not have so far been spared. Seasonal outbreaks of cholera is a regular feature in Calcutta. Both cholera and infectious hepatitis are water-borne. Hence, outbreaks of infectious hepatitis should have been a regular feature too. "The pathogenesis of the disease is by no means clear, and it may be that some activiting factor, such as that met with in infectious hepatitis of mice, is necessary to enable the hepatitis virus to produce its full effect. This activating factor might have been present to cause the Delhi outbreak. Until the exact nature of this activating agent were known, it would be impossible to predict precisely from the detection of fæcal contamination alone that an outbreak of infectious hepatitis was imminent.

Excretal contamination of water, especially of large cities, seems to be inevitable. All the water that is excreted, or is used for ablution, bathing, or washing, cannot just be thrown away waste, partitioned off completely and effectively, from the water that is to be used again. The economy of Nature would not permit that; so much fresh water cannot be produced now and then to meet the needs of man. What, however, could be done with human ingenuity is to make the excreta as inocuous as possible, and dilute it so well that water contaminated with these still remains potable. This needs a team work of public health bacteriologists, chemists, engineers, and administrators, and the public at large. The levels of safety of drinking water, and the methods of ensuring such safety, can be laid down by the

bacteriologists, but the enforcement of these criteria is a more general responsibility. Prevention of dangerous contamination is as much a public responsibility as that of public health personnel. If all the cholera stools, or the fæces of those suffering from infectious hepatitis, were thrown away without prior disinfection into the gutter, the community has naturally to blame itself for its doom.

Prevention of water-borne epidemics should be easy if dangerous fæcal pollutions could be avoided by all means. It is futile to depend on senses of taste and smell to detect such contamination. Bacteriological and chemical tests are available for detection of fæcal contamination of water. However, it should be remembered that such tests are not infallible. Moreover, mere absence of evidence of fæcal pollution does not necessarily indicate that pollution has not taken place. All it does show is that at the time the sample was examined, there was no detectable evidence of pollution. It is the enforcement of scrupulous sanitation, encouragement of general hygiene, and frequent checks on sanitary engineering devices, that are better safeguards against water-borne epidemics, than mere bacteriological and chemical tests on water-pollution.

Spread of outbreak of infectious hepatitis can also be prevented by mass-immunisation with gamma-globulin. The prophylactic effect of gamma-globulin on infectious hepatitis has been reported in the past, as well as very recently. As little as 0·01 ml. per lb. body weight given intramuscularly during the incubation period may apparently prove effective. There is, however, a dangerous drawback of such immunisation. The virus of serum jaundice may be present in the blood used for the preparation of the gamma-globulin. Use of this virus-containing gamma-globulin would cause great scare by virtually producing the jaundice which it was claimed to prevent. It, however, appears that the gamma-globulin prepared by the ethanol process is free from the virus. Ethanol precititated gamma-globulin would, therefore, appear to be a safe prophylactic. It is, however, of no value for the treatment of established disease.

This prophylactic value of gamma-globulin would naturally suggest the need for preparation of gamma-globulin for prevention of future outbreaks, and it has entreated the blood banks of India to take up this task. The magnitude of this task should however, be appreciated before proceeding with such an ideal.

A skin test has recently been devised for differentiating the immunes from the nonimmunes. For this test, an antigen prepared by irradiation of infected anniotic fluid is used. A positive reaction is produced in about 50 per cent of those suffering from the disease, while between 90 and 100 per cent of those recovered show positive reaction. The test, thus, reveals presence of hypersensitivity which is very closely associated with immunity.

No figures for proportionate distribution of the immunes and non-immunes in a given population are yet available in this country. Yet, the large incidence in the Delhi outbreak would suggest that quite a considerable number of non-immunes would prevail in any city. Hence, in a city like Calcutta, perhaps about one million persons would need immunisation, assuming that three-fourths of the population are immunes while only the remaining one-fourth would need immunisation. The average dose of gamme-globulin, which is required to immunise the non-immunes, would not be less than 1 ml. per person. Hence, about one- million ml. of gamma-globulin would be required for launching a mass-immunisation campaign in Calcutta.

Ethanol precipitated Fraction II of Cohn which consists of gamma-pseudoglobulin—the richest carrier of immune bodies—represents approximately five per cent of the plasma proteins. And plasma constitutes

only about half the volume of the blood. Hence, 40 ml. of blood would yield only 1 ml. of gamma-globulin of adequate concentration. On the basis of this approximate calculation, over 40 million ml. of human blood would be required to meet one immunisation campaign in Calcutta.

It should also be taken into account that immunisation with gamma-globulin is as short-lived as passive immunisations would be expected to be. However, the human gamma-globulin, being homologous protein, would last for about six months. Hence, if an epidemic threatens again after the lapse of this period, another 40 million ml. of human blood would be required.

Would this appear to be a possible proposition in a welfare country where mass-immunisation with such inexpensive materials as tetanus and diphtheria toxoids has not yet been possible? Yet it is a well-known fact that the toxoids induce immunity of the longest duration much longer than that obtained with all passive immunising agents and most of the active immunising agents too.

Meat-Borne Diseases.

Disease agents in meat arise either from original infection in the animal carcass, or through secondary contamination from human beings or environment. The major diseases involved may be classified as follows :—

Disease in man.	Principal sources of of meat infection.
Anthrax	Cattle, goats, sheep, swine.
Botulism	All animals; environment.
Brucellosis	Cattle, goats, sheep, swine.
Clostridium welchi (*B. Perfringens Gastro-enteritis.*	All animals; environment.
Erysipeloid	Swine.
Hydatidosis (cycle must be completed through dog or other carnivore).	Cattle, goats, sheep, swine.
Salmonellosis	All animals, man.
Shigellosis	Man.
Staphylococcal entero-toxic gastro-enteritis.	All animals, man.
Stereptococcal gastro-enteritis.	All animals, man.
Taeniasis	Cattle, swine.
Trichinosis	Swine.
Tuberculosis	All animals

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1 Government of India	India—1955	1955
2 W H.O.	Expert Committee on the Professional and Technical education of Medical and Auxilliary personnel. Technical Report, series No. 69.	1955
3 British Information Services ..	Manual of Nutrition	1954
4 Duke and Elder	Diseases of the Eye (12th Edition) ..	1951
5 Stitt, Clough and Branham ..	Practical Bacteriology, Hæmatology and Parasitology (10th Edition).	1948
6 Dr. S. Chandrasekhar	Hungry People and Empty lands ..	1954
7 Do. ..	India's Population	1954
8 Do. ..	Population and Planned Parenthood in India.	1954
9 Taber	Taber's Medical Dictionary	1955
10 Government of India, Ministry of Agriculture.	Facts about State trading in Food	1955

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